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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/643,742

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Steven L. Scott

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SCHWEGMAN, LUNDBERG & WOESSNER, P.A.

P.O. BOX 2938

MINNEAPOLIS, MN 55402

EXAMINER

KIM, HONG C.

ART UNIT

PAPER NUMBER

2185

MAIL DATE

DELIVERY MODE

04/09/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/643,742	Applicant(s) SCOTT ET AL.	
	Examiner Hong Kim	Art Unit 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 and 34-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-20 is/are allowed.
- 6) ☒ Claim(s) 1-10, 21-32, and 34-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/7/08</u> . | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

1. Claims 1-32 and 34-38 are presented for examination. This office action is in response to the RCE filed on 2/27/08.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 2/7/08 is being considered by the examiner

Specification

3. Applicants are requested to update the status of the related U.S. patent application accordingly (e.g., U.S. Patent Application Serial No. ####,### filed Sept. 07, 1990, now abandoned; ..., now U.S. Patent #,###,### issued Jan. 01, 1994; or This application is a continuation of Serial Number ####,###, filed on December 01, 1990, now abandoned; ...etc.). Also applicants are requested to include the status of the related U.S. applications or patents in the CROSS-REFERENCE TO RELATED APPLICATIONS section and in any other corresponding area in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 5-6, 21-23, 25-26, 31-32, 34, 36, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith, III et al. (Smith) US Patent No. 6,339,813.

As to claims 1, 21, 31, 34 and 38, Smith discloses in a computer system (Fig. 1) having a plurality of processors (Fig. 1 Refs. 104) connected to a shared memory (Fig. 1 Ref. 106), a method of decoupling a write address (Fig. 1 Ref. 109) from its corresponding write data (Fig. 1 Ref. 110) in a store to the shared memory, comprising: generating a write request address (col. 2 lines 16 and 31-32) for a memory write, wherein the write request address points to a memory location in the shared memory; issuing a write request (col. 2 lines 31-33) and to the shared memory, wherein the write request includes the write request address; noting the write request address in the shared memory (col. 2 lines 31-44); comparing (col. 2 line 35), in the shared memory, addresses in subsequent load and store requests to the write request address (col. 2 lines 36-39, cache line); transferring the write data to the shared memory (col. 2 lines 36-39); matching (col. 2 lines 535-44, cache hit reads on this limitation), within the shared memory, the write request address to its corresponding write data; and storing the write data into the shared memory as a function of the write request address (col. 2 lines 35-43).

As to claims 2, 22, 32, and 36, Smith further discloses wherein the shared memory includes a store address buffer (Fig. 2 Ref. 205, tag) and wherein noting the write request address includes writing the address in the store address buffer (Fig. 5 ref.

626).

As to claims 3 and 23, Smith discloses the invention as claimed the above.

Smith further discloses comparing addresses in subsequent load and store requests includes stalling subsequent read requests to the write request address until the write data is written into the shared memory (col. 2 line 42, retry and defer read on this limitation).

As to claims 5 and 25, Smith further discloses wherein the shared memory includes a bit vector (col. 5 line 40), wherein noting the write request address in the shared memory includes setting one or more bits in the bit vector corresponding to the write request address, and wherein comparing addresses in subsequent load and store requests to the write request address includes comparing bits that would be set corresponding to the load and store request addresses the bits set for the write request address and stalling servicing of the load and store requests if there is a match (col. 2 lines 16+).

As to claims 6 and 26, Smith discloses the invention as claimed above.

Smith further discloses comparing addresses in subsequent load and store requests includes stalling subsequent read requests to the write request address until the write data is written into the shared memory (col. 2 lines 16-44).

Claim Rejections - 35 USC ' 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith US Patent No. 5,796,980 in view of Parks US Patent No 6,356,983.

As to claims 4 and 24, Smith discloses the invention as claimed the above.

However, Smith does not specifically disclose wherein the shared memory includes a cache, wherein noting the write request address includes changing a state in a cache line associated with the write request address to "WaitForData", and wherein comparing addresses in subsequent load and store requests to the write request address includes accessing the cache and stalling if a cache line hit returns a "WaitForData" state.

Parks discloses wherein the shared memory includes a cache, wherein noting the write request address includes changing a state in a cache line associated with the write request address to "WaitForData" (Fig. 5 Ref. BUSY), and wherein comparing addresses in subsequent load and store requests to the write request address includes accessing the cache and stalling if a cache line hit returns a "WaitForData" state (Fig. 5) for the purpose of maintaining cache coherency.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate wherein the shared memory includes a cache, wherein noting the write request address includes changing a state in a cache line associated with the write request address to "WaitForData", and wherein comparing addresses in subsequent load and store requests to the write request address includes accessing the cache and stalling if a cache line hit returns a "WaitForData" state as shown in Parks into the invention of Smith for the advantages stated above.

6. Claims 7-10, 27-30, 35, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith, III et al. (Smith) US Patent No. 6,339,813 in view of Handy, The Cache Memory Book, Jim Handy, Academic Press, 1993, pp 73-84.

As to claims 7 and 27, Smith discloses the invention as claimed the above.

However, Smith does not specifically disclose comparing addresses in subsequent read and write requests includes servicing the load and store requests to addresses other than the write request address without waiting for the write data to be written to the write request address.

Handy discloses comparing addresses in subsequent read and write requests includes servicing the load and store requests to addresses other than the write request address without waiting for the write data to be written to the write request address (page 8.3 nonblocking cache) for the purpose of increasing data access speed and bandwidth.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate comparing addresses in subsequent

read and write requests includes servicing the load and store requests to addresses other than the write request address without waiting for the write data to be written to the write request address as shown in Handy into the invention of Smith for the advantages stated above.

As to claims 8 and 28, Smith and Handy disclose the invention as claimed above. Handy further discloses comparing addresses in subsequent load and store requests includes servicing the load and store requests to addresses other than the write request address without waiting for the write data to be written to the write request address (page 83 nonblocking cache).

As to claims 9, 29, and 37, Smith and Handy disclose the invention as claimed above. Handy further discloses comparing addresses in subsequent load and store requests includes enforcing memory ordering in subsequent read and write requests to the write request address until the write data associated with the first write request is written into the shared memory (page 83 aborting cache).

As to claims 10, and 30, and 35, Smith and Handy disclose the invention as claimed above. Handy further discloses issuing a write request includes ensuring that all vector and scalar loads from shared memory for that processor have been sent to shared memory prior to issuing the write request (page 83 aborting cache).

Allowable Subject Matter

7. Claims 11-20 are allowed.

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached PTO-892.
2. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) days from the mail date of this letter. Failure to respond within the period for response will result in **ABANDONMENT** of the application (see 35 USC 133, MPEP 710.02, 710.02(b)).
3. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. ' 1.111(c).
4. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hong C Kim whose telephone number is (571) 272-4181. The examiner can normally be reached on M-F 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 whose telephone number is (571) 272-2100.

6. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

7. **Any response to this action should be mailed to:**

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to TC-2100:
(571)-273-8300

Hand-delivered responses should be brought to the Customer Service

Art Unit: 2185

Window (Randolph Building, 401 Dulany Street, Alexandria, VA 22314).

/Hong Kim/

Primary Examiner, Art Unit 2185

April 2, 2008